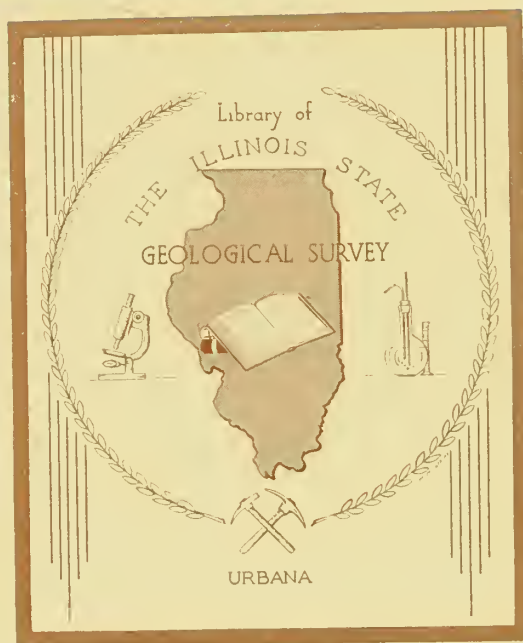
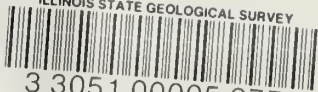




ILLINOIS STATE GEOLOGICAL SURVEY



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THE HISTORY OF THE UNITED STATES

CHAPTER I. THE DISCOVERY OF AMERICA.

1492.

Christopher Columbus, an Italian navigator, sailed from Spain in search of a westward route to India.

He discovered the Americas on October 12, 1492.

His voyage was sponsored by the Spanish monarchs, Isabella and Ferdinand.

He landed on the island of San Salvador.

His discovery opened the way for European exploration and settlement of the Americas.

He returned to Spain with valuable cargo.

His voyage was a major event in the history of the world.

It marked the beginning of the Age of Discovery.

His discovery led to the colonization of the Americas by Europeans.

He was hailed as a hero and a pioneer.

His name is associated with the discovery of America.

His voyage was a landmark in the history of exploration.

He was a brave and adventurous man.

His discovery was a turning point in the history of the world.

He was a man of vision and courage.

His discovery was a great achievement for his time.

He was a man of great ability and skill.

His discovery was a great contribution to the world.

He was a man of great character and integrity.

His discovery was a great event in the history of the world.

He was a man of great courage and determination.

His discovery was a great achievement for his time.

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ILLINOIS STATE GEOLOGICAL SURVEY
John C. Frye, Chief Urbana, Illinois
March 1967



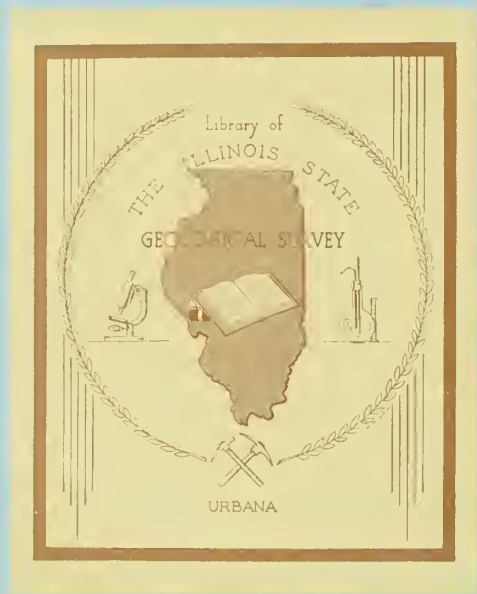
INDUSTRIAL MINERALS NOTES 29

CLAY AND SHALE RESOURCES OF CLARK, CRAWFORD, CUMBERLAND, EDGAR, EFFINGHAM, JASPER, AND VERMILION COUNTIES, ILLINOIS

W. Arthur White and Walter E. Parham

A B S T R A C T

Twenty-eight samples taken from shales and clays occurring in the Mattoon, Bond, and Modesto Formations in Clark, Crawford, Cumberland, Edgar, Effingham, Jasper, and Vermilion Counties, were tested to determine their potential ceramic properties. The clays and shales may be used for making drain tile, flower pots, pottery, refractories, sewer pipe, and structural clay products. The shales might be used in the manufacture of lightweight aggregate and ceramic block.



CLAY AND SHALE RESOURCES OF CLARK, CRAWFORD, CUMBERLAND, EDGAR,
EFFINGHAM, JASPER, AND VERMILION COUNTIES, ILLINOIS

W. Arthur White and Walter E. Parham

INTRODUCTION

This report on the clay resources of seven eastern Illinois counties—Clark, Crawford, Cumberland, Edgar, Effingham, Jasper, and Vermilion—(fig. 1) is one of a series designed to help in the development of new clay and shale deposits that may be suitable for industrial use (tables 1 and 2).

Reports on other areas of the state previously published include those by St. Clair (1920), Lamar (1928, 1931, 1948), Grim (1933, 1934, 1950), Grim and Bradley (1939), Piersol, Lamar, and Voskuil (1933), Willman and Payne (1942), Parham (1959, 1960, 1961), Parham and White (1963), and White (1963). Reports on clay resources of the entire state have been made by Rolfe et al. (1908), Parmelee and Schroyer (1921), Grim (1935, 1941), Grim and Allen (1938), Grogan and Lamar (1945), Jonas (1957), White (1959, 1960, 1962), White and Lamar (1960), White and Machin (1961), and White and O'Brien (1964).

Twenty-eight samples, representative of the noncalcareous clays and shales of the seven-county area, were studied for this report. The descriptions of the deposits sampled are listed alphabetically by county, and the sample numbers, location, lithology, and thickness of the lithological units are given for each deposit in table 1.

STRATIGRAPHIC OCCURRENCE OF CLAYS AND SHALES

The portion of eastern Illinois sampled is covered by Pleistocene glacial deposits (drift) that range from a few feet to over 300 feet thick (Kemal Piskin and R. E. Bergstrom, personal communication, 1967). The drift is less than 50 feet thick in most of Crawford, Jasper, Effingham, Cumberland, and Clark Counties, but where it has filled pre-Pleistocene valleys it may be more than 100 feet thick. In Edgar and Vermilion Counties, the drift averages more than 50 feet thick, although in large areas it is thinner. Where pre-Pleistocene valleys have been

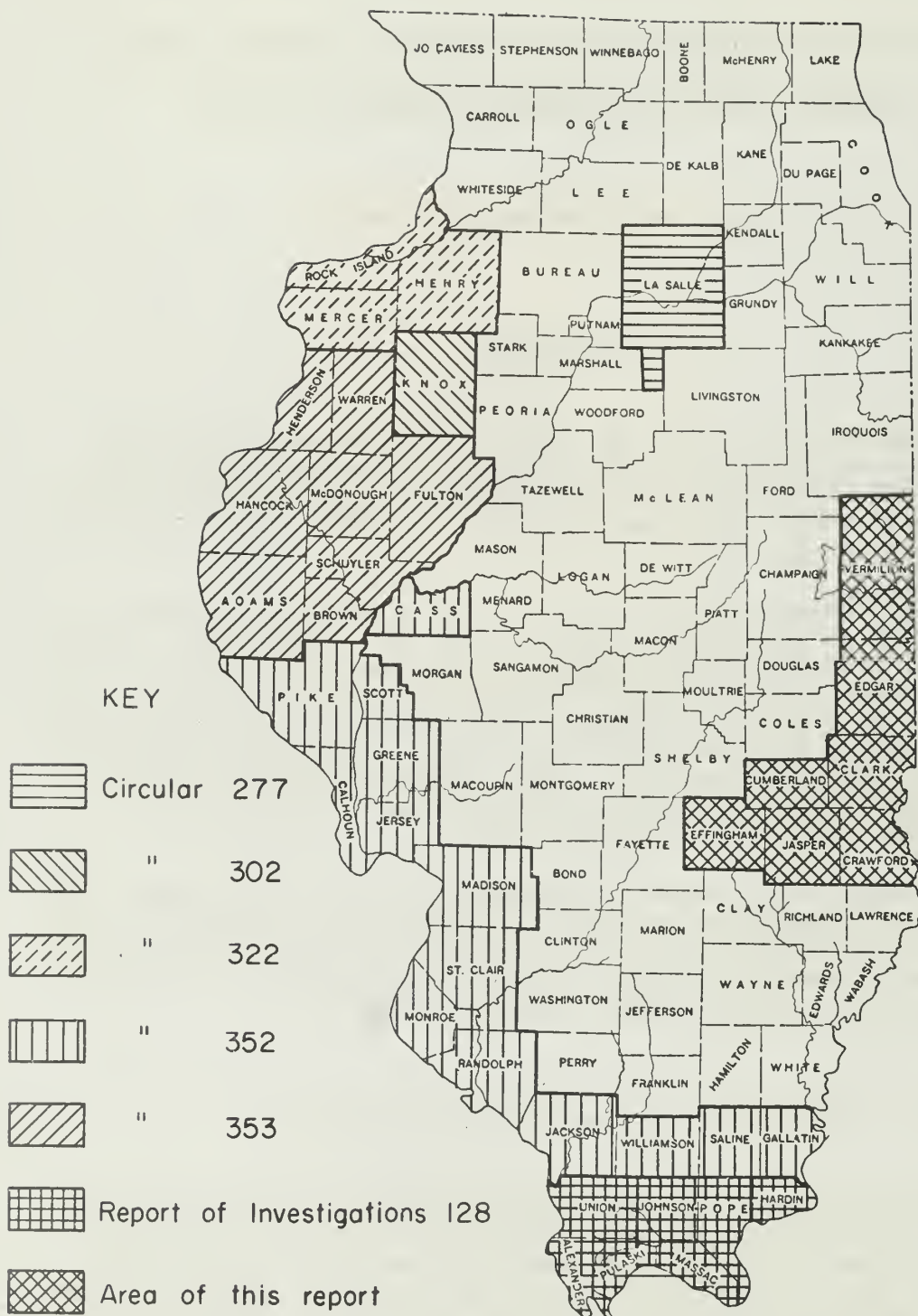


Fig. 1 - Location of counties from which samples of clay and shale were taken for this investigation. Areas covered in other reports on clay and shale resources are indicated.

filled, drift thickness may reach 200 to 300 feet. North of Danville, the drift is even more than 300 feet thick (Piskin and Bergstrom, personal communication, 1967). The drift generally is thicker at terminal and recessional moraines than in the intervening areas of ground moraine.

The glacial drift is dominantly clay and clayey silt, but it is mostly calcareous and suitable only for products fired at low temperatures. No samples of the drift are included in this study.

Classification of the Pennsylvanian strata of the area of this report is shown in figure 2 (modified from Kosanke et al., 1960). Members that will help stratigraphically in locating the samples are listed. Other geological reports of the area have been written by Bradley (1870), Broadhead (1875), Worthen (1875), Campbell and Leverett (1900), Blatchley (1913), Rich (1916), Cady (1920), Mylius (1923), Newton and Weller (1937), Horberg (1950, 1953), DuBois (1951), Eveland (1952), Schwalb (1953), Williams and Rolley (1955), Potter (1956), Clegg (1959, 1965), and Kosanke et al. (1960).

The samples investigated in this report came from the Modesto, Bond, and Mattoon Formations of the McLeansboro Group of the Pennsylvanian System of rocks. The areas in which these formations occur are delineated in figure 3; sample localities are numbered.

MINERALOGY

The mineralogy of the clay and shale samples was determined by X-ray and megascopic techniques. The clay minerals common to most of these samples are illite, kaolinite, chlorite, and mixed-layer clay minerals of the illite and chlorite types. The important nonclay minerals are chiefly quartz, but minor amounts of pyrite, siderite, calcite, and gypsum also are present. The last three occur in only a few of the clays or shales. Gypsum, a weathering product, most often occurs on or near the surface of the weathered shale.

Four clay samples reported herein (table 1) from Edgar and Vermilion Counties contained considerably more kaolinite than the samples of other shales and underclays from the area. No illite or chlorite was found in these clays.

TEST BAR FORMATION AND FIRING PROCEDURE

Each sample was air dried, ground, and had water added. A laboratory extrusion machine was then used to form good, hard test bars measuring 1 x 1 x 6 inches. The behavior of the clay during the extrusion process indicated its workability. The water of plasticity was

TABLE 1—PLASTIC AND FIRING PROPERTIES

Sample	Location						Ma- ter- ial	Thick- ness (ft)	Work- abil- ity	Water of plasti- city (%)	Linear drying shrink- age (%)
	1/4	1/4	1/4	Sec.	T.	R.					
CLARK COUNTY											
1855	SW	NE	NW	29	11N	10W	Sh*	11	Good	18	4.1
1856	NE	NE	NW	21	10N	12W	Sh	10	Good	15	2.2
1857	NW	NE	NW	13	9N	12W	Sh	13	Good	17	2.0
1858	NE	SW	NE	4	9N	12W	Sh	19	Fair	18	2.3
1859	SE	SE	NE	18	10N	12W	Sh	15	Fair	20	1.7
1860			SE	3	9N	14W	Sh	27	Good	21	4.2
CRAWFORD COUNTY											
2059	SE	SW	SW	6	5N	11W	Sh	16	Good	19	3.2
2062	7/8 mi. S T-road at Richwood where pri- vate road crosses No Business Creek				6N	10W	Sh	15	Good	25	3.8
CUMBERLAND COUNTY											
2044	NE	NE	SE	25	9N	7E	Sh	18	Good	18	1.7
2049	SE	SW	SW	27	9N	8E	Sh	40	Good	12	2.0
2050	NE	SE	SE	26	9N	7E	Sh	20	Fair	18	2.5
2064	SE	NE	SW	13	10N	7E	Sh	11	Fair	22	3.5
EDGAR COUNTY											
1861	NE	SW	NW	32	14N	10W	Sh	22	Good	18	3.3
1862	NE	SE	NE	29	14N	10W	Sh	28	Good	18	3.7
2048	NW	SW	SW	4	14N	10W	Sh	32	Good	16	2.2
1870	SE	NE	NE	29	14N	10W	Cl [†]	5	Poor	17	4.5
1876	NW	SW	SW	4	14N	10W	Cl	3	Fair	13	4.3
EFFINGHAM COUNTY											
2066	NW	NW	NE	21	7N	6E	Sh	18	Fair	17	2.8
JASPER COUNTY											
2046	NE	SW	NE	2	7N	9E	Sh	18	Fair	23	5.8
2047	SE	SE	SE	35	7N	9E	Sh	31	Fair	18	2.2
2054	SE	NW	SE	36	8N	9E	Sh	14	Good	23	3.3
2056	NE	SE	NE	21	7N	9E	Sh	23	Fair	18	2.0
2057	SW	NE	SE	29	8N	9E	Sh	11	Fair	23	3.1
2068	SE	SE	SE	12	7N	8E	Sh	11	Good	20	3.3
2070	SW	SW	SE	2	7N	9E	Sh	25	Fair	21	2.8
VERMILION COUNTY											
2041	NW	NW	NW	22	19N	12W	Sh	55	Good	19	2.0
1877	NW	NW	SW	25	19N	12W	Cl	10	Poor	15	3.4
2040	NE	SE	SE	23	19N	13W	Cl	9	Poor	11	4.0

* Sh = shale; † Cl = clay

OF CLAY MATERIALS IN EASTERN ILLINOIS

Firing Temperature in Degrees Fahrenheit									
Linear Firing Shrinkage			Total Linear Shrinkage			Burning Color			Sample
1832°	2012°	2200°	1832°	2012°	2200°	1832°	2012°	2200°	
CLARK COUNTY									
4.2	6.1	0.7	8.3	10.2	3.4	red	red	brown	1855
2.7	6.4	3.2	4.9	8.6	5.4	red	red	brown	1856
3.0	7.5	5.5	5.0	9.5	7.5	red	red	red	1857
2.7	6.9	3.0	5.0	9.2	5.3	red	red	brown	1858
4.1	9.1	7.3	5.8	10.8	9.0	red	red	red	1859
1.6	6.7	0.6	5.8	10.9	4.8	red	red	red	1860
CRAWFORD COUNTY									
7.7	9.5	8.2	10.9	12.7	11.4	red	red	brown	2059
7.8	13.5	11.7	11.6	17.3	15.5	lt. red	red	red	2062
CUMBERLAND COUNTY									
5.0	10.0	6.7	6.7	11.7	8.4	red	red	brown	2044
4.8	10.0	4.7	6.8	12.0	6.7	red	red	brown	2049
6.7	10.5	5.8	9.2	13.0	8.3	red	red	brown	2050
6.2	10.5	11.3	9.7	14.0	14.8	red	red	red	2064
EDGAR COUNTY									
2.4	7.4	4.7	5.7	10.7	8.0	red	red	red	1861
4.0	7.8	2.5	7.7	11.5	6.2	red	red	red	1862
4.8	9.2	6.2	7.0	11.4	8.4	lt. red	red	gray-brown	2048
2.2	3.6	3.8	6.7	8.1	8.3	cream	cream	buff	1870
2.4	3.5	3.2	6.7	7.8	7.5	cream	buff	buff	1876
EFFINGHAM COUNTY									
7.0	9.5	6.5	9.8	12.3	9.3	red	red	brown	2066
JASPER COUNTY									
9.6	10.0	-	15.4	15.8	-	red	red	-	2046
6.3	10.5	6.7	8.5	12.7	8.9	red	red	brown	2047
10.0	10.5	-	13.3	13.8	-	red	red	-	2054
6.0	10.0	8.0	8.0	12.0	10.0	red	red	red	2056
5.7	11.2	7.8	8.8	14.3	10.9	red	red	brown	2057
7.7	10.0	7.7	11.0	13.3	11.0	red	red	brown	2068
6.7	11.3	9.6	9.5	14.1	12.4	red	red	brown	2070
VERMILION COUNTY									
6.3	10.8	-	8.3	12.8	-	red	red	-	2041
0.4	4.3	4.2	3.8	7.7	7.6	salmon	salmon	tan	1877
6.2	7.5	7.2	10.2	11.5	11.2	salmon	red	red	2040

TABLE 2-SUGGESTED USES FOR EASTERN ILLINOIS CLAY MATERIALS

Sample	Suggested Uses					Overburden (ft)	Remarks
	Drain tile	Flower pots	Pot- tery	Sewer pipe	Structural clay products		
CLARK COUNTY							
1855	X	X	X	X	X	47	Overburned at 2200° F
1856	X	X	X	X	X	46	Overburned at 2200° F
1857	X	X	X	X	X	17	Overburned at 2200° F
1858	X	X		X	X	53	Overburned at 2200° F
1859	X	X		X	X	45	Overburned at 2200° F
1860	X	X	X	X	X	40	Overburned at 2200° F
CRAWFORD COUNTY							
2059	X	X	X	X	X	8	Overburned at 2200° F
2062			X	X		12	Overburned at 2200° F
CUMBERLAND COUNTY							
2044	X	X	X	X	X	5	Overburned at 2200° F
2049	X	X	X	X	X	5	Overburned at 2200° F
2050	X	X		X	X	10-15	Overburned at 2200° F
2064	X	X	X	X	X	2	Overburned at 2200° F
EDGAR COUNTY							
1861	X	X	X	X	X	23	Overburned at 2200° F
1862	X	X	X	X	X	10	Overburned at 2200° F
2048	X	X	X	X	X	50	Overburned at 2200° F
1870						18	P.C.E. 27-28
1876						45	
EFFINGHAM COUNTY							
2066	X	X		X	X	10	Overburned at 2200° F
JASPER COUNTY							
2046	X	X	X	X	X	10	Overburned at 2012° F (short firing range)
2047	X	X			X	20	Overburned at 2200° F
2054	X	X		X		5	Short firing range
2056	X	X			X	10	Overburned at 2200° F
2057	X	X			X	5	Overburned at 2200° F
2068	X	X	X	X	X	5	Overburned at 2200° F
2070	X	X			X	5	Overburned at 2200° F
VERMILION COUNTY							
2041	X	X	X	X	X	40	Overburned at 2012° F (short firing range)
1877	X	X			X?	45	Low heat refractory
2040		X	X		X		Should be used with more plastic clay

System	Group	Formation	Named member
Pleistocene Series			
Pennsylvanian	McLeansboro	Mattoon	Reisner Limestone Woodbury Limestone Gila Limestone Greenup Limestone Bogota Limestone Effingham Limestone Shumway Limestone Omega Limestone Bonpas Limestone Calhoun Coal Trowbridge Coal Cpdyke Coal Shelbyville Coal McCleary's Bluff Coal Friendsville Coal
		Bond	Millersville-Livingston Limestone Reel Limestone Flannigan Coal Mt. Carmel Sandstone Shoal Creek Limestone
		Modesto	Macoupin Limestone Womac Coal Cramer Limestone Chapel (No. 8) Coal Trivoli Sandstone West Franklin Limestone
	Kewanee	Carbondale	Danville (No. 7) Coal
		Spoon	Colchester (No. 2) Coal
	McCormick	Abbott Caseyville	
Mississippian			

Fig. 2 - Stratigraphic classification of the Pennsylvanian strata of the report area.

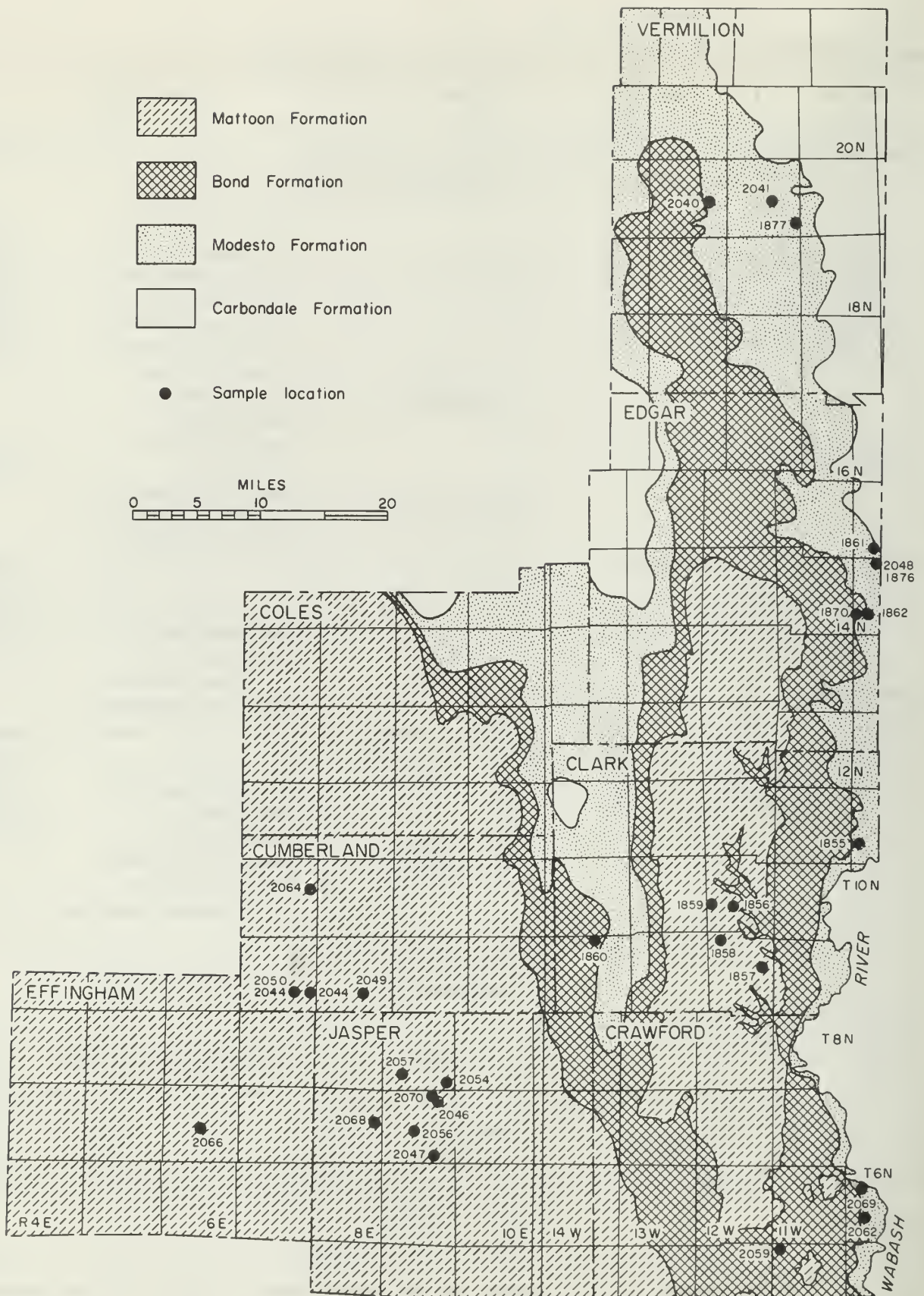


Fig. 3 - Locations from which samples were taken for testing.
(Areal geology by Kenneth E. Clegg.)

determined from 1-inch cubes as the bars were formed. All bars were air dried and then placed in an oven at 230° F (110° C) overnight. A set of three test bars was made for each sample; one bar was fired to 1832° F (1000° C), another to 2012° F (1100° C) and the third to 2200° F (1204° C).

Linear shrinkage during drying (called "linear drying shrinkage") was determined for all bars, and total linear shrinkage was determined for each set of fired bars. The linear firing shrinkage--the difference between the total linear shrinkage after firing and the linear drying shrinkage--was next determined. The burning color was determined from the fired bars.

Results of the tests are given in table 1.

GEOLOGIC DESCRIPTIONS OF OUTCROPS SAMPLED

Field descriptions of outcrops from which the samples were taken are listed below by county.

CLARK COUNTY

SAMPLE 1855

SW NE NW sec. 29, T. 11 N., R. 10 W.

	Thickness	
	(ft)	(in)
PLEISTOCENE		
Till and loess	40	
PENNSYLVANIAN		
McLeansboro Group		
Bond Formation		
Shoal Creek Limestone	4	
Modesto Formation		
Shale	1	6
Shale, fissile, black.	1	
Coal	1	
Underclay.	4	6
Shale (sample 1855).	11	
Cover		

SAMPLE 1856

NE NE NW sec. 21, T. 10 N., R. 12 W.

PLEISTOCENE	
Till and loess	40

Thickness
(ft) (in)

PENNSYLVANIAN

McLeansboro Group

Mattoon Formation

Shale, sandy towards base (sample 1856)	10	
Merom (?) Sandstone	1	
Shale, gray	3	
Shale, fissile, black	1	
Underclay, calcareous	3	6
Cover	8	

SAMPLE 1857

NE NW and NW NE NW sec. 13, T. 9 N., R. 12 W.

Cover	7
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PENNSYLVANIAN

McLeansboro Group

Mattoon Formation

Merom Sandstone, shaly	10
Shale, sandy near top, thinly bedded in middle (sample 1857)	13
Cover	

SAMPLE 1858

NE SW NE sec. 4, T. 9 N., R. 12 W.

PLEISTOCENE

Till	10
----------------	----

PENNSYLVANIAN

McLeansboro Group

Mattoon Formation

Merom Sandstone, rust colored	38
Shale, light gray; calcareous nodules	3-4
Shale, fissile, black	1
Shale, gray (sample 1858)	8
Sandstone, calcareous, shaly	2
Shale (sample 1858)	2
Shale, sandy (sample 1858)	1
Shale (sample 1858)	2
Shale, sandy (sample 1858)	2
Shale, brown (sample 1858)	4
Shale, calcareous, black	1

SAMPLE 1859

SE SE NE sec. 18, T. 10 N., R. 12 W., roadcut

PLEISTOCENE

Till and loess	45
--------------------------	----

	Thickness	
	(ft)	(in)
PENNSYLVANIAN		
McLeansboro Group		
Mattoon Formation		
Shale, noncalcareous, fissile, black, pimply	1	6
Shale, dark gray	1	6
Coal, shaly	0	2
Shale, noncalcareous (sample 1859)	12	
Creek level		

SAMPLE 1860

Cen. NW to cen. SE SE, sec. 3, T. 9 N., R. 14 W.

PLEISTOCENE

Till and loess 20-25

PENNSYLVANIAN

McLeansboro Group

Bond Formation

Shale, noncalcareous, gray	8-10	
Coal	0	7
Underclay, lower half calcareous	6	
Sandstone, ripple marked	4	
Shale, tan, noncalcareous; ironstone concretions, some up to 5' long (sample 1860)	4	
Shale, noncalcareous, gray; ironstone concretions (sample 1860)	23	
Shoal Creek Limestone	3	

Modesto Formation

Shale and shaly sandstone	10	
Shale, gray; ironstone concretions	10	
Sandstone	10	
Shale, black	1	
Shale, fissile, black	2	6
Womac Coal	0	8
Underclay.	5	
Limestone, sandy	2	
Cover	5	
Sandstone.	3	
Shale, sandy; ironstone concretions.	7	
Cover	15	
Shale		
Creek		

C R A W F O R D C O U N T Y

SAMPLE 2059

SE SW SW sec. 6, T. 5 N., R. 11 W.

SAMPLE 2059—Continued

	Thickness	
	(ft)	(in)
Cover	5	
PENNSYLVANIAN		
McLeansboro Group		
Bond Formation		
Sandstone, silty, buff	2-3	
Shale, gray, well bedded (sample 2059)	16	
Limestone, fossiliferous	1	6

SAMPLE 2062

7/8 mile south of Richwood where private road crosses
No Business Creek, T. 6 N., R. 10 W.

PENNSYLVANIAN

McLeansboro Group

Modesto Formation

Sandstone interbedded with shale	4	
Shale, silty, thinly bedded; contains calcareous concretions	8	
Shale, dark gray, thinly bedded (sample 2062).	15	
Coal		7
Underclay.		10

C U M B E R L A N D C O U N T Y

SAMPLE 2044

NE NE SE sec. 25, T. 9 N., R. 7 E., 50 yards upstream
on east side of Spring Point Creek

PLEISTOCENE

Till and loess	5	
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PENNSYLVANIAN

McLeansboro Group

Mattoon Formation

Shale, dark gray; weathers tan (sample 2044)	18	
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SAMPLE 2049

SE SW SW sec. 27, T. 9 N., R. 8 E., at bridge

PENNSYLVANIAN

McLeansboro Group

Mattoon Formation

SAMPLE 2049—Continued

	Thickness (ft) (in)	
Shale; top tan; bottom dark gray (sample 2049)	40	
Cover		

SAMPLE 2050

NE SE SE sec. 26, T. 9 N., R. 7 E., branch of Spring
Point Creek and N-S road out of Montrose

Cover	10-15	
PENNSYLVANIAN		
McLeansboro Group		
Mattoon Formation		
Shale, tan (sample 2050)	20-25	
Cover		

SAMPLE 2064

SE NE SW sec. 13, T. 10 N., R. 7 E.

Cover	2	
PENNSYLVANIAN		
McLeansboro Group		
Mattoon Formation		
Shale, sandy, tan (sample 2064)	11	
Shale, fissile, dark gray	0	6

E D G A R C O U N T Y

SAMPLES 1861, 1870

NE NW NW sec. 28, T. 14 N., R. 10 W.

PLEISTOCENE	8	
PENNSYLVANIAN		
McLeansboro Group		
Modesto Formation		
Shale, tan	1	6
Shale, gray; ironstone concretions	6	
Cramer Limestone	0	4-6
Shale, fissile, black	1	6
Chapel (No. 8) Coal	0	5
Underclay, noncalcareous (sample 1870)	5	
Shale, brown; ironstone concretions (sample 1861). . .	22	
Cover	10-15	

SAMPLE 1862

NE SE NE sec. 29, T. 14 N., R. 10 W.

	Thickness	
	(ft)	(in)
PLEISTOCENE	10	
PENNSYLVANIAN		
McLeansboro Group		
Modesto Formation		
Shale, gray; ironstone concretions (sample 1862) . . .	28	
Limestone, lenticular	0	0-5
Chapel (No. 8) Coal	0	5
Underclay	0	10
Cover		

SAMPLES 2048, 1876

NW SW SW sec. 4, T. 14 N., R. 10 W.

PLEISTOCENE	15	
PENNSYLVANIAN		
McLeansboro Group		
Modesto Formation		
Shale	30	
Limestone.		6
Black shale.		10
Coal	0	6
Underclay.	3	6
Shale, gray green; ironstone layers (sample 2048). . .	32	
Cover		

E F F I N G H A M C O U N T Y

SAMPLE 2066

NE NW NE sec. 21, T. 7 N., R. 6 E., outcrop along
north side of E-W road

PLEISTOCENE	5-10	
PENNSYLVANIAN		
McLeansboro Group		
Mattoon Formation		
Shale, tan; contains 2" limestone lens 4' from bottom (sample 2066).	18	
Shale, fissile, black.	0	1
Shale, gray.	0	7
Coal	0	2-6
Underclay, calcareous.	4	
Sandstone, shaly at top, tan	3	
Sandstone, white, calcareous	1-2	
Cover		

J A S P E R C O U N T Y

SAMPLE 2046

NE SW NE sec. 2, T. 7 N., R. 9 E., along Lick Creek Thickness
(ft) (in)

Cover	10	
PENNSYLVANIAN		
McLeansboro Group		
Mattoon Formation		
Shale (sample 2046)	18	
Shale, fissile, black	1	
Limestone	0	8
Underclay, calcareous, marine in upper 8"	4	

SAMPLE 2047

SE SE SE sec. 35, T. 7 N., R. 9 E.,
along creek and roadcut

PLEISTOCENE 15-20

PENNSYLVANIAN

McLeansboro Group

Mattoon Formation

Shale, dark gray; sandy beds 12' and 16' above creek (sample 2047)	31	
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SAMPLE 2054

NE SE NW SE sec. 36, T. 8 N., R. 9 E., cut bank on east
side of Lick Creek, 50 yards south of E-W road

Cover	5	
PENNSYLVANIAN		
McLeansboro Group		
Mattoon Formation		
Shale, gray (sample 2054)	14	
Shale, dark gray	1	
Shale, fissile, black	0	10
Limestone	0	6
Shale, calcareous	0	6

SAMPLE 2056

NE SE NE sec. 21, T. 7 N., R. 9 E.,
east face of Jordan Hill

SAMPLE 2056—Continued

	Thickness (ft) (in)
PLEISTOCENE	
Till	10
PENNSYLVANIAN	
McLeansboro Group	
Mattoon Formation	
Shale (sample 2056)	23
Cover	20

SAMPLE 2057

SW NE SE sec. 29, T. 8 N., R. 9 E., along southeast
bank of creek, 50 yards above fork

Cover	5	
PENNSYLVANIAN		
McLeansboro Group		
Mattoon Formation		
Shale, gray, thinly bedded (sample 2057)	11	

SAMPLE 2068

SE SE SE sec. 12, T. 7 N., R. 8 E.

PLEISTOCENE		
Till	5	
PENNSYLVANIAN		
McLeansboro Group		
Mattoon Formation		
Shale, tan (sample 2068)	11	
Shale, calcareous	1-2	
Shale, dark gray; poor fissility	0	6
Shale, fissile, black	1	
Clay, calcareous, tan	9	

SAMPLE 2070

SW SW SE sec. 2, T. 7 N., R. 9 E.

PLEISTOCENE	5	
PENNSYLVANIAN		
McLeansboro Group		
Mattoon Formation		
Shale, buff (sample 2070)	25	

VERMILION COUNTY

SAMPLE 2041

NW NW NW sec. 22, T. 19 N., R. 12 W.

Thickness
(ft) (in)

PLEISTOCENE	40-50	
PENNSYLVANIAN		
McLeansboro Group		
Modesto Formation		
Shale, sandy at bottom of upper one-third		
(sample 2041)	55	
Cover		

SAMPLE 2040

NE SE SE sec. 23, T. 19 N., R. 13 W.

PLEISTOCENE	50	
PENNSYLVANIAN		
McLeansboro Group		
Modesto Formation		
Clay, reddish brown (sample 2040)	9	

SAMPLE 1877

NW NW SW sec. 35, T. 19 N., R. 12 W.

PLEISTOCENE		
Till	30	
PENNSYLVANIAN		
McLeansboro Group		
Modesto Formation		
Shale, gray.	15	
Shale, coaly	0	1
Underclay; gray top; black and tan at bottom		
(sample 1877)	4	
Clay, red, green, and gray mottled (sample 1877) . . .	6	
Limestone		

CONCLUSIONS

The clays and shales of the area studied may be suitable for one or more of the following uses—drain tile, flower pots, pottery,

refractories, sewer pipe, and structural clay products. The shales might also be used in the manufacture of lightweight aggregate and ceramic blocks. Samples 1870, 1876, 1877, and 2040 from Edgar and Vermilion Counties (table 1) are the most refractory clays encountered in this region and perhaps might be suitable for low heat duty refractories.

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